SECTION 14210

ELECTRIC TRACTION ELEVATIORS

PART 1 - GENERAL

1.1 SUMMARY

A. In accordance with Contract Documents, provide all labor, material, and services to furnish, fabricate, deliver to site, and install four traction elevators

1.2 RELATED DOCUMENTS

A. Legal Hoistway and Pit:
1. Clear plumb elevator hoistway with variations not to exceed 1" at any point.
2. Bevel cants (15° from vertical) over any rear or sidewall ledges and beams that project or recess 2" or more into the hoistway. Cants are not required on hoistway divider beams.
3. Divider beams between adjacent elevators at each floor, pit and overhead.
4. Wall blockouts for control and signal fixtures.
5. Cutting/patching walls and floors; necessary grouting.
6. Wall pockets and/or structural beams for support of machine, sheave, and dead-end beams.
7. Erection of front hoistway wall after elevator entrances are installed.
8. Grouting around hoistway entrances and sills after installation.
9. Pit ladders, one for each elevator.
10. Structural supports for car and counterweight buffer impact loads, guide rail loads.
11. Waterproof pit.
12. Protecting elevator hoistways and entrances during construction per OSHA Regulations.
13. Protecting cabs, door entrance assemblies and special metal finishes from damage after installation.
14. Venting or other means to prevent

B. Legal Machine Room:
1. Enclosure with access ladders or stairs.
2. Self-closing and locking access doors.
3. Cooling and heating.
4. Painting elevator machine room walls, ceiling and floor.
5. Sealing fireproofing to prevent flaking.
6. Fire extinguisher.

C. Electrical Service, Conductors and Devices:
1. Lighting and convenience outlets in elevator pit and machine room.
2. 3-phase mainline power feeders to terminals of each elevator controller with protected, lockable "off", disconnect switch.
3. Power feeders to each elevator controller for lighting and exhaust blower. Individual disconnect switch at machine room location shown on Elevator Sub-contractor's shop drawings.
4. Signal fixture power feeders to machine room elevator control panel designated by the Elevator Sub-contractor.
5. Temporary power and illumination to install, test, and adjust elevator equipment.

D. Standby Power Provisions:

1. Standby power of the same voltage characteristics via normal electrical feeders to run each single elevator and one elevator in each group at a time at rated speed.
2. Conductors to signal power source from the standby power transfer switch to an elevator control panel as designated by the Elevator Sub-contractor. A time delay of approximately 15 seconds for pre-transfer signal in either direction will be provided.
3. Standby single-phase power to group controller, and each elevator controller for lighting, exhaust blower, emergency call bell, and hoist machine cooling fans.
4. Means for absorbing regenerated power during an overhauling load condition.

1.3 DEFINITIONS

A. Terms used are defined in the latest edition of the Safety Code for Elevators and Escalators, ASME A17.1.

B. Reference to a device or a part of the equipment applies to the number of devices or components required to complete the installation.

1.4 QUALITY ASSURANCE

A. Approved Manufacturers:
1. Traction Elevators: Fujitec, Kone, Otis, Schindler.
2. Car Enclosures: Brice-Southern, Hauenstein & Burmeister, Kone, Otis, Schindler, Tyler.
3. Hoistway Entrances: Brice-Southern, Hauenstein & Burmeister, Kone, Otis, Schindler, Tyler.

B. Document Verification: In order to discover and resolve conflicts or lack of definition, Elevator Bidders shall review contract documents for compatibility with their products prior to bidding. Review structural, architectural, electrical and mechanical drawings, and specifications. Attach specific, written exceptions and/or clarifications with quotation. Bidder's compliance with all provisions of documents is required in absence of written exceptions. Cost of changes to structural, mechanical, electrical or other systems required to accommodate Bidders' equipment shall be assumed by the Elevator Contractor if not identified prior to contract award.

C. Compliance with Regulatory Agencies: Comply with most-stringent applicable provisions of following Codes, including revisions in effect on date of these specifications:
1. Safety Code for Elevators and Escalators ASME A17.1.
2. Inspectors' Manual, ASME A17.2.
3. National Electrical Code, No. ANSI/NFPA 70.
4. The Americans with Disabilities Act, ANSI A117.1 Specifications for Providing Accessibility and Usability for Physically Handicapped People.
5. Requirements of Local Building Code and any other Codes, Ordinances and Laws applicable within the governing jurisdiction.

D. Warranty:
1. Materials and workmanship of the elevator installation shall comply in every respect with contract documents. Unless due to ordinary wear and tear, or improper use or care by Purchaser, correct defects which develop within one year from date of final acceptance of work to the satisfaction of the Construction Manager at no additional cost.
2. Perform modifications, adjustments, improvements, etc., to meet performance requirements defined in Parts 2 and 3.

E. Date-Related Operational Compliance: All computer programming, including but not limited to software and firmware, in all elevator system components, including the monitoring

system, shall be free from any and all operational defects which may be caused by date recognition.

1.5 SUBMITTALS

A. Within 60 days after award of contract and prior to beginning equipment fabrication, submit shop drawings and required material for review as outlined in General and Supplementary Conditions. Allow 15 days for response to submittals.
   1. Scaled or Fully Dimensioned Layouts: Plan of pit, hoistway and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, etc.
   2. Design Information: Indicate equipment lists, reactions and design information on layouts.
   3. Power Confirmation Sheets: Include motor horsepower, code letter, starting current, full-load running current, and demand factor for applicable motors.
   4. Finish Material: Submit 3" x 12" samples or 12" lengths of actual finished materials for Construction Manager's review of color, pattern and texture only. Compliance with other requirements is the exclusive responsibility of the Elevator Sub-contractor. Include signal units, pushbuttons, lights, graphics, Braille plates and mounting provisions.
   5. Fixtures: Cuts, samples or shop drawings

B. Acknowledge and/or respond to drawing markup within 7 days of return; promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Revision response is not justification for delivery or installation delay.

C. Car Enclosure Mock-up: Provide one pre-production passenger elevator car enclosure mock-up, in the car enclosure manufacturer's factory for review by the Construction Manager. Mock-up to be identical in all respects to specified car enclosure, subject to submittal comments.

1.6 PERMITS, TESTS AND INSPECTIONS

A. Obtain and pay for permits, licenses and inspection fees necessary to complete the elevator installation.

B. Perform tests required by Consultant, Governing Authority and the ASME A17.1 Safety Code For Elevators And Escalators, with procedures described in ASME A17.2 Inspectors' Manual for Elevators and Escalators, in the presence of Authorized Representatives.

C. Supply personnel and equipment for tests and final reviews indicated in Part 3 at no added cost.

1.7 MAINTENANCE

A. Interim:
   1. When one or more elevators are near completion and declared ready for service, the Construction Manager or Contractor may accept elevators for interim use and place them in service before entire installation of all elevators has been completed and accepted.
   2. During this period Contractor may pay Elevator Subcontractor a mutually agreed amount per elevator for preventive maintenance. Indicate amount per unit per month with bid.

3. Elevator Subcontractor's temporary acceptance form provisions must be acceptable to both parties, and form signed prior to use by any party other than Elevator Subcontractor.
4. User must agree to provide temporary hoistway and car enclosures, protect installed equipment and finishes, and perform or arrange to pay for all cleaning, repairs, and replacement of materials necessary to restore elevator to "as-new" condition before final acceptance by Construction Manager.

B. New Equipment Contract (Warranty Period):
1. Preventive maintenance and unlimited 24-hour emergency call-back service, in accordance with requirements of the enclosed maintenance agreement, on all equipment described herein for a period of 12 months commencing on date of final acceptance of all elevators by Construction Manager. Systematically examine, adjust, clean and lubricate all equipment. Repair or replace defective electrical and mechanical parts using parts produced by the Manufacturer of installed equipment. Maintain elevator machine rooms, hoistways, and pits in clean condition.
2. Use competent personnel supervised and employed by the Elevator Subcontractor.
3. Indicate cost for this maintenance with the bid. The Construction Manager may elect to add this cost to the installation contract or pay for this service on a monthly basis as work is performed. Indicate amount for this maintenance on the bid form.

C. Contact (Ongoing Preventive Maintenance Program): Quote monthly cost for 5-year maintenance agreement commencing on completion of the 12-month period in "B" above. Submit quote based upon terms and conditions of the Contractor's standard form of agreement. Base on current costs; price adjustment will be allowed at commencement date and thereafter as provided in agreement.

1.8 TEMPORARY USE

A. Do not elevators for construction purposes, or during the construction period of the building without written permission from the Construction Manager.

B. Temporary service will require the Construction Manager to provide the following at no additional cost to the Owner:
1. Execute the elevator supplier's standard temporary acceptance forms and pay per diem maintenance costs.
2. Before acceptance by Construction Manager, perform repairs, replacement, and cleaning as needed to restore the elevator equipment to its original new condition.

1.9 VISIBLE ITEMS

A. No exposed fasteners or manufacturer's logo's shall be visible to elevator users.

PART 2 - PRODUCTS

2.1 SUMMARY

Elevators No.:	P1, P2	P3, P4
Rated Load:	3500#	4000#
Rated Speed:	350 fpm	350 fpm
Machine Type:	Geared	Geared
Roping:	1:1	1:1
Floors Served:	B2, B1, O1 - O4	B1, O1 - O5

Elevators No.:	P1, P2	P3, P4
Travel:	79’-4”	74’-8”
Stops:	6	6
Platform Size:	7’-0” x 6’-2”	8’-0” x 6’-2”

2.2 MATERIALS

A. Steel:
1. Sheet Steel, Furniture Steel for Exposed Work: Stretcher-leveled, cold-rolled, commercial-quality carbon steel, complying with ASTM A366, matte finish.
2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial-quality carbon steel, pickled and oiled, complying with ASTM A569.
3. Structural Steel Shapes and Plates: ASTM A6, ASTM A36, and ASTM A108.

B. Stainless Steel: Type 302 or 304 complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability. Apply mechanical finish on fabricated work in the locations shown or specified. (Federal Standard and NAAMM nomenclature), with texture and reflectivity required to match Construction Manager's sample. Protect with adhesive-paper covering. Provide #4, bright directional polish (satin finish). Graining direction as shown or, if not shown, in longest dimension.

C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

D. Plastic Laminate: ASTM E84 Class A and NEMA LD3, Fire-Rated Grade (FR-50), Type 7, 0.050" +/- .005" thick; color and texture as follows:
1. Exposed Surfaces: Color and texture selected by Construction Manager.
2. Concealed Surfaces: Manufacturer's standard color and finish.

E. Fire-Retardant Treated Particle-Board Panels: Minimum 3/4" thick backup for natural finished wood, and plastic laminate veneered panels, edged and faced as shown, provided with suitable anti-warp backing; meet ASTM E84 Class "I" rating with a flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.

F. Paint: Clean exposed unfinished metal of oil, grease, scale and other foreign matter and factory paint one shop coat of Manufacturer's standard rust-resistant primer. After erection, provide one finish coat of Industrial enamel paint.

G. Prime Finish: Clean all surfaces receiving a baked enamel finish of oil, grease, scale, etc. Apply one coat of rust-resistant mineral paint followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of mineral paint.

H. Baked Enamel: Prime per "G" above. Apply and bake 3 additional coats of enamel in the selected solid color.

2.3 PERFORMANCE

A. Speed: +/- 3% of contract speed under any loading condition.

B. Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Stopping Accuracy: +/- 1/4" under any loading condition.

D. Door Open Time: As measured in seconds from start of door open cycle until door is fully open:
   1. Elevators Number P1, P2: 1.5
   2. Elevator Number P3, P4: 1.6

E. Performance Time: As measured in seconds from start of door open cycle until door is ¾ open at an adjacent floor:
   1. Elevators Number P1, P2: 9.6
   2. Elevators Number P3, P4: 9.9

2.4 OPERATION

A. Duplex Selective Collective, Provide for Elevators Number P1, P2 and P3, P4:
   1. Duplex Selective Collective (Elevators No. 1 & 2): Operate elevators without attendants from buttons in cars and at each landing. When cars are idle, park one car at entry floor ("home" car). Park other car where last used ("free" car). Respond to car calls and hall calls above entry floor using the "free" car. Once a car has started, respond to registered calls in the direction of travel in the order the floors are reached. Do not reverse car direction until all car calls have been answered, or until all hall calls ahead of the car, and corresponding to the direction of car travel, have been answered. Slow down and stop cars automatically at floors corresponding to registered calls, in the order in which they are approached in each direction of travel. As slow down is initiated for a hall call, automatically cancel that call and render the hall button for that direction of travel ineffective until the elevator leaves floor. Cancel car calls in the same manner. Hold car at arrival floor an adjustable time interval to allow passenger transfer. Answer calls corresponding to direction in which car is traveling unless call in the opposite direction is the highest (or lowest) call registered.
   2. When the free car is clearing calls, start home car shall respond to:
      a. A call registered on home car buttons.
      b. An up hall call registered below free car while free car is traveling up.
      c. An up or a down call registered above free car while free car is traveling down.
      d. A hall call when free car is delayed in its normal operation for a predetermined period.
   3. When both are clearing calls, stop only one car in response to any registered hall call. Return the first car to clear its calls to entry floor. Should last service required bring both cars to main floor, the first arriving car becomes the free car. Illuminate the appropriate button to indicate call registration. Extinguish light when call is answered.

B. Required Features:
   1. Dispatch Protection: Backup dispatching in the event primary dispatcher fails.
   2. Delayed Car Removal: Remove delayed car from group operation.
   3. Position Sensing: Reset at each floor when stop made.
   4. Landing Button Failure: Multiple power sources for button risers.
   5. Duplicate Communicator Link: Communication links duplicated by all group and individual car computers.
   6. Provide each elevator group with integral CRT and keyboard for monitoring and diagnostic capability of all car and group control functions.
   7. Include card reader operation on elevators number 1 - 4 to enable/disable car call registration on a fully selective basis.
   8. Load Weighing: Provide means for weighing passenger load. Design control system to provide dispatching in advance of normal intervals and to provide landing call by-pass when the car is filled to adjustable percentage of rated capacity. Provide adjustment range of 10% to 100%.
   9. Anti-Nuisance Feature: If car loading is not commensurate with registered car calls, cancel car calls.

10. Door Operation: Automatically open door when elevator arrives at main landing whether car call has been registered or not. When another elevator is at main landing loading for departure, close arriving elevator's doors and reopen when elevator is designated for loading.

C. Automatic Stopping Accuracy: Stop car within 1/4" above or below the landing sill. Avoid overtravel, as well as undertravel, and maintain stopping accuracy regardless of load in car, direction of travel, rope slippage or stretch.

D. Independent Service: Provide controls for operation of each elevator from car buttons only. Close doors by constant pressure on desired destination floor button. Open doors automatically upon arrival at selected floor.

E. Motion Control: A.C.VVVF type with closed-loop feedback. Control to be suitable for operation specified and capable of providing smooth, comfortable acceleration, retardation and dynamic braking. Limit the difference in speed between full load and no load to not more than +/-3% of the contract speed. Design, install and adjust elevator equipment to meet performance requirements of Paragraph 2.3 within the following parameters.
1. Horizontal Acceleration within Car Enclosures during All Riding and Door Operating Conditions: Not more than 15 mg peak to peak in the 1-10 Hz range.
2. Acceleration and Deceleration: Constant and not more than 5 feet/second with an initial ramp between 0.5 and 0.75 second.
3. Sustained Jerk: Not more than 8 feet/second.

F. Firefighters' Service: Per Code, to operate and recall elevators to designated or alternate floor in fire or other emergency condition. Provide similar operation and fixtures on all elevators. Operate visual/audible signal until return is complete or automatic operation restored.

G. Standby Lighting and Alarm: Car-mounted, battery unit with solid-state charger to operate alarm bell and normal car lighting. Battery to be rechargeable with 5-year minimum-life expectancy. Provide momentary test button in service cabinet of car station that causes illumination of standby lighting bulbs. Illuminate normal car lighting and maintain alarm bell operability for Code-required duration using standby battery source.

H. Standby-Power Transfer: If normal power fails, adequate standby power will be supplied through normal power feeders to start and run one elevator in each group at rated speed.
1. Provide controls to automatically start and run elevators nonstop to designated terminal, one car per group at a time. Provide controls in the firefighters' panel so that any one elevator may be selected to run continuously.
2. Design solid-state-controlled equipment to ensure that any waveform distortion and harmonic content will not adversely affect operation of standby generator.

2.5 MACHINE ROOM EQUIPMENT

A. Arrange equipment in spaces shown in bid drawings. Provide identifying numbers on machine, power conversion unit, controller, and disconnect switch.

B. Geared Traction Machine, Provide for Elevators Number P1 - P4:
1. Worm gear traction type with motor, brake, gear, drive shaft, and gear case mounted in proper alignment on isolated bedplate. Provide switch on brake that prevents elevator movement unless brake is picked.
2. Provide digital closed-loop motor-control.
3. Roping: 1:1.

C. Solid State Power Conversion and Regulation Unit:
   1. Design unit to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors. Elevator Sub-contractor responsible to suppress solid-state converter noises, radio frequency interference, and eliminate regenerative voltage transients induced into mainline feeders or standby power generator.

D. Encoder: Solid-state, optical, digital-count type, mechanically coupled to pit-tensioning sheave, or driven from the car governor. Update parity at each floor and restore automatically after power loss. Locate in machine room to monitor car position and provide absolute floor position for stopping.

E. Controller - Microprocessor-Based Individual Car and Group:
   1. Frame: Securely mount all assemblies, power supplies, chassis switches, relays and other items on a substantial, self-supporting steel frame. Completely enclose equipment with covers and ventilate to prevent overheating.
   2. Switch and Relay Design: Direct-current type, magnet operated with contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear, and provide a wiping action to prevent sticking due to fusion. Provide switches carrying highly inductive currents with arc deflectors or suppressers.
   3. Power Supplies: UL or CSA recognized, with short-circuit protection.
   4. Wiring: CSA labeled copper wires for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
   5. Permanently mark all controller components with symbols shown on drawings.
   6. Provide all necessary diagnostic equipment, software, and written instructions to allow all maintenance and troubleshooting functions to be successfully performed by a third party of the Construction Manager's choosing. Diagnostic equipment shall not require any periodic re-programming to maintain full functionality.
   7. Card Reader Provisions, Elevators Number 1 - 4: Furnish and install wiring from card reader to controller and terminate on clearly designated terminal blocks.

F. Sleeves and Guards: 2" steel angle guards around cable or duct slots. Provide rope and smoke guards for sheaves, cables, and cable slots.

G. Machine and Equipment Support Beams: Structural steel beams required for direct support of elevator machine, deflector sheaves, overhead sheaves, governor, and dead-end hitches. Provide bearing plates, anchors, shelf angles, blocking, and embedments.

H. Governor: Centrifugal-type with pull-through jaws and bi-directional electrical shutdown switches. Provide machine-room mounted governor complete with supports required for attachment to building structure.

I. Hoist Machine Drip Pans: Provide metal containers to collect lubricant seepage.

J. Noise and Vibration Control:
   1. Minimize noise and vibration in occupied areas, mechanically isolate elevator equipment including hoist machines, deflector sheaves, power-conversion units and support equipment from the structure; electrically isolate controllers, machine motors, and power conversion units.
   2. Limit noise level relating to elevator equipment and its operation to no more than 60 dBA in elevator cars under any condition including door operation and exhaust blower on highest speed.

2.6 HOISTWAY EQUIPMENT

A. Guide Rails: Planed steel T-sections suitable for elevator travel, car weight, counterweight, with brackets for attachment to building structure. Provide backing and intermediate counterweight tie brackets to meet Code requirements. Note distance between supports.

B. Buffers: Oil type with blocking and supports. Provide switch on buffers to limit elevator speed in either direction if buffer is compressed. Provide inspection platforms and ladders where required due to depth of pit.

C. Sheaves: Machined grooves with ball or roller bearings. Provide mounting means to machine beams, machine bedplate, and car and counterweight structural members.

D. Governors and Encoder Pit-Tensioning Sheaves: Mount sheaves and frames on pit support members or guide rails. Provide with guides or pivot points to enable free vertical movement and properly tension ropes or tapes.

E. Counterweight: Steel frame with metal filler weights, guided by roller guide shoes, 3 adjustable, spring-loaded, rollers per shoe, ELSCO model “D” or approved equal.

F. Hoist and Governor Ropes:
   1. 8 x 19 or 8 x 25 construction, traction steel type.
   2. Governor rope to suit Manufacturer's specification.

G. Normal and Final Terminal Stopping Devices: Per Code.

H. Electrical Wiring and Wiring Connections:
   1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control cabinets, junction boxes, or conduits. Provide 10% spare conductors throughout. Provide 4 pairs of shielded communication wires in addition to those required to connect specified items. Run spare wires from car connection points to individual elevator controllers in the machine room. Tag spares so they can be identified in the machine room.
   2. Provide CCTV wiring in traveling cable, coordinate requirements with CCTV supplier, terminate in separate junction box adjacent to each controller.
   3. Conduit, Etc.: Painted or galvanized steel conduit and duct. Conduit size, 1/2" minimum. Do not use flexible conduit exceeding 36" in length. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
   4. Traveling Cables: Flame and moisture-resistant outer cover. Prevent traveling cables from rubbing or chafing against hoistway or elevator equipment within hoistway. Provide CCTV traveling cable and 6 shielded twisted pairs of communication wires. Include integral “T” shielded wiring for card reader system. Coordinate wiring type with reader manufacturer.

I. Entrance Equipment:
   1. Door Hangers: 2-point suspension with upthrust adjustment. Tire rollers so that no metal-to-metal contact exists.
   2. Door Tracks: Bar type, cold-drawn steel with smooth hanger contact surface. Provide removable tracks for replacement.
   3. Interlocks: Provide type operable without retiring cam. Paint interlocks flat black.
   4. Closers: Spring or spirator type.

J. Pit Stop Switch: Per Code.

K. Floor Numbers: Stencil painted 4" high floor numbers within the hoistway per Code.

2.7 HOISTWAY ENTRANCES

A. Provide complete entrances bearing UL test labels.

Elevator:	P1, P2	P3, P4
Type:	Center Opening	Center Opening
Size:	3’-6” x 7’-0”	4’-0” x 7’-0”
Finish:	Stainless Steel #4	Stainless Steel #4

B. Frames: Hollow metal, fabricated from not less than 14-gage material to form a one-piece unit. Permanently attach handicapped floor designations 2" high, per A.D.A. requirements, 60" above the floor. Provide stud-mounted designations with registration pins. Provide welded frames with joints ground smooth.

C. Transoms: None.

D. Door Panels: 16-gage steel, sandwich construction without binder angles. Provide a minimum of 2 gibs per door panel, one at leading and one at trailing edge with gibs in the sill groove their entire length of travel.

E. Sight Guards: One-piece 14-gage material, same material, height, and finish as hoistway entrance door panels.

F. Sills: Nickel Silver.

G. Sill Support Angles: Structural or formed shape designed to support sill without need for grouting.

H. Fascia, Toe Guards and Hanger Covers: 14-gage galvanized furniture steel.

I. Struts and Headers: Provide for support of entrances and related material. Provide door open bumpers on entrances equipped with vertical struts.

J. Unlocking Devices: Provide at each entrance with stainless steel escutcheon.

2.8 CAR EQUIPMENT

A. Carframe: Welded or bolted, rolled or formed steel channel construction.

B. Safety Device: Type "B", flexible guide clamp.

C. Platform: Isolated type, constructed of steel, or wood that is fireproofed on the underside.

D. Guide Shoes: Adjustable spring-loaded roller type with 6 sound-deadening rollers per shoe, maximum rotation speed, 350 rpm. Provide Elsco Model A guides.

E. Finish Floor Covering: As specified under other sections of the work.

F. Car Sills: Extruded full depth nickel silver.

G. Toe Guard: Per Code.

H. Car Doors, Hangers and Tracks: Provide as specified for hoistway entrance doors, hangers and tracks.

I. Header: Construct of steel, shape to provide stiffening flanges.

J. Car Door Electrical Contact: Arrange so that elevator cannot operate unless doors are closed within tolerance allowed by Code.

K. Car Door Clutches: Heavy-duty clutches, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutches so car doors may be closed for maintenance purposes, while hoistway doors remain open.

L. Door Operator and Operation: High-speed, heavy-duty, DC master door operator capable of opening doors at no less than 2-1/2 fps, and accomplishing reversal in no more than 2-1/2" of door movement. Open doors automatically when car arrives at a floor to permit passenger transfer. Close doors automatically after an adjustable timed interval. Provide closed-loop control over position, velocity, current, and voltage. Provide integral restrictor device. Acceptable models:
   1. Kone: MAC HPM
   2. Otis: HP Lim
   3. Schindler: QKS-15

M. Infrared Detector Device-Elevator: Pulsed-screen car door protective device projecting across entire entrance opening. If detector is obstructed for a predetermined, adjustable interval (20-30 seconds), sound solid-state tone, doors to remain open until obstruction is removed. Provide Panaforty model by Janus.

N. Differential Door Time: Provide separately adjustable timers to enable varying time that doors remain open after stopping in response to calls.
   1. Car Call: Hold open time adjustable between 3 and 4 seconds.
   2. Landing Call: Hold open time adjustable between 5 and 10 seconds per A.D.A. requirements. Use landing call timing when responding to coincidental calls.

O. Elevator Car Stations, provide as follows:
   1. Provide stations without faceplates, consisting of a metal box containing the operating fixtures, mounted behind the car enclosure swing front return panel for all elevators. Provide one station for each elevator.
   2. Suitably identify floor buttons, alarm button, and door open button by raised letters and symbols per A.D.A. requirements. Locate operating controls no higher than 48" above the car floor; 35" for alarm button.
   3. Provide 1/8" raised floor pushbuttons that illuminate to indicate call registration.
   4. Provide illuminating alarm button at bottom of station to ring bell located on elevator. Provide illuminating button to initiate 2-way communication.
   5. Provide door open button to stop and reopen closing doors. Make button operable while car is stopped at landing, regardless of special operational features, except firefighters' service.
   6. Provide one firefighters' service key switch with engraved instructions per local requirement, light jewel, buzzer and call cancel button. Provide firefighters' phone jack, with wiring to machine-room junction box.
   7. Provide lockable service panel with recessed, flush cover plate matching return panel including integral certificate frame. Include the following controls with purpose and operating positions identified by engraved letters painted black:

a. Inspection switch, conforming to the Code, for disconnecting automatic operation, limiting the car speed and activating hoistway access switch when car is at terminal landing.
b. Light switch.
c. 3-position exhaust blower switch.
d. Independent service switch to permit selection of independent or automatic operation.
e. Duplex 120-volt, AC, electrical convenience outlet.
f. Momentary contact emergency light test switch.

8. Provide black paint filled engraving with size and style approved by Construction Manager as follows:
a. "No Smoking".
b. Elevator number.
c. Elevator capacity in pounds.
d. Firefighters' instructions.
9. Door Hold Open Button: Provide for elevators number P3 and P4. Operates to extend door hold open period up to 30 seconds to facilitate passenger transfer. Cancel extended time by registration or re-registration of destination call.
10. Finish: Stainless steel #4.

P. Car Top Control Station: Per Code.

Q. Emergency Exits: Per Code, with shutdown contact.

R. Work Light and Duplex Plug Receptacle: Top and bottom of elevator car. Provide lights with on-off switch and bulb guard.

2.9 CAR ENCLOSURES

A. Provide the following features for Elevators Number P1 - P4. Refer to design drawings.
1. Shell: Reinforced 14-gage furniture steel with baked enamel interior finish. Apply sound-deadening mastic to exterior. Provide 8'-0" shell.
2. Top: Reinforced 12-gage furniture steel with hinged exit openable from car top only. Size top exit to permit ready removal of ceiling panel. Finish with white, reflective baked enamel.
3. Front Return Panels and Integral Entrance Columns: 14 gage stainless steel. Entire unit to swing on concealed hinges or pivots for access to integral car station wiring and fixtures. Secure in closed position with concealed 3-point latch. Provide cabinet with flush door for service controls and cutouts for pushbuttons.
4. Ceiling: ¾-inch plywood faced and edged with stainless steel, #4 finish.
5. Transom: 14 gage stainless steel, #4 finish.
6. Car Door Panels: Same construction as hoistway door panels, stainless steel #4 finish.
7. Base: Polished terazzo.
8. Cab Side and Rear Walls: Removable ¾" wood panels faced and edged with maple veneer, satin polyurethane finish, as shown in drawings. Provide stainless steel reveals and bar stock as shown.
9. Ventilation: 2-speed exhaust blower mounted on isolated rubber grommets, Morrison Products, Model OE with diffuser and grille.
10. Lighting: Indirect fluorescent with electronic ballasts.
11. Handrails: Stainless steel bar, #4 finish, 3/8-inch x 1¼-inch removable from within the car enclosure. Reinforce shell for mounting handrail.
12. Trim material and finish: Stainless steel, #4 finish.

2.10 LANDING CONTROL STATIONS

A. Pushbuttons: Provide one riser each for elevators P1, P2 and P3, P4. Include pushbuttons for each direction of travel that illuminate to indicate call registration. Etch, to a depth between 0.02” and 0.04”, safety message, "In Case of Fire..." in accordance with ASME A17.1 Appendix H in pushbutton faceplate and fill. Provide Firefighters’ keyswitch in faceplate as directed by Construction Manager (CM). Provide LED illumination.

B. Hoistway Access Switches: Mount in entrance frame side jamb at all top terminals and bottom terminals where walk-in pits are not provided. Provide fixture without faceplate.

2.11 SIGNALS AND FIREFIGHTER’S KEY BOX

A. Hall Lanterns: Provide at each opening, above each entrance to indicate travel direction of arriving elevator to waiting passengers. Illuminate indicators with shielded lights, and sound electronic tone mechanism mounted in a metal box. Illuminate up or down lights and sound tone as car approaches floor. Illuminate until elevator doors start to close. Confirm location with CM.

B. Car Position Indicator: Digital type representing the floor served and direction of car travel. Locate above each car operating station. When a car leaves or passes a floor, illuminate numeral representing position of car in hoistway. Illuminate proper direction arrow to indicate the direction of travel. Use LED or vacuum-fluorescent type units. Provide solid state passing tone of adjustable volume. Confirm location with CM.

C. Firefighters' Switch and Box: Flush-mounted station and box with lockable hinged cover for firefighters' service per Local Fire Authority requirements.

2.12 COMMUNICATIONS SYSTEMS

A. Provide full duplex type hands-free telephone actuated by communication button in one car station of each elevator, mounted integrally in one front return panel with speaker grille. Terminate wiring in junction box on each elevator controller. Provide master station in fire-command center that allows origination and receipt of communication to any elevator. Provide device which automatically dials an alternate number should call to primary destination remain unanswered after four rings. Provide station in each machine room capable of initiating and responding to communication between elevators associated with that machine room. Master and machine room stations shall provide illuminating numerals representing elevators initiating or responding to communication. Voice signal shall be static-free and have volume readily adjustable.

B. Mount fire command station integral with other functional devices specified for all elevators. Provide all conduit and wiring for a complete, functioning installation. Provide stainless steel, #4 finish faceplate.

C. In addition, provide a speaker with grille, mounted above dropped ceiling for building annunciation. Provide traveling cable between speaker and clearly-marked controller studs for connection to annunciation system.

D. Install firefighters’ phone jack in front return panel. Provide traveling cable between jack and clearly-marked controller studs for connection to communication system.

2.13 FIRE COMMAND PANEL AND MONITORING PANELS

A. Provide one Fire Command Display consisting of digital-type position and direction readouts for each elevator, out-of-service conditions, standby power operation, and status of two-way communication system. Provide code-compliant standby-power selection switches. Coordinate design with console manufacturer.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION

A. Prior to beginning installation of equipment, examine hoistway and machine room areas. Verify that no irregularities exist which affect execution of work specified.

B. Do not proceed with installation until work in place conforms to project requirements.

3.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in Manufacturer's original, unopened protective packaging.

B. Store material in original protective packaging. Prevent soiling, physical damage, and wetting.

C. Protect equipment and exposed finishes during transportation, erection, and construction against damage and stains.

3.3 INSTALLATION

A. Install each equipment item in accordance with Manufacturer's direction, referenced codes, and specifications.

B. Install machine room equipment with clearances in accordance with referenced codes and specifications.

C. Install items so they may be easily removed for maintenance and repair.

D. Install items such that access for maintenance is safe and readily available.

E. Clean the following items of oil, grease, scale, and other foreign matter, and apply one coat of field-applied machinery enamel.
   1. All exposed equipment and metal work installed as part of this work, which does not have architectural finish.
   2. Machine room equipment.
   3. Neatly touch up damaged factory-painted surfaces with original paint and color. Protect machine-finish surfaces against corrosion.

3.4 FIELD QUALITY CONTROL

A. Work at the jobsite will be checked during the course of installation. Full cooperation with reviewing personnel is mandatory. Accomplish corrective work required prior to performing further installation.

B. Have Code Authority acceptance inspection performed and complete corrective work.

3.5 ADJUSTMENTS

A. Align guide rails vertically with tolerance of 1/16" in 100'. Secure joints without gaps and file any irregularities to a smooth surface.

B. Balance cars to equalize pressure of guide shoe rollers on rails.

C. Lubricate all equipment in accordance with Manufacturer's instructions.

D. Adjust all equipment to achieve required performance levels.

3.6 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis as equipment is installed.

B. Remove all loose materials and filings resulting from work.

C. Clean machine room equipment and floor of dirt, oil, and grease.

D. Clean hoistways, cars, and car enclosures.

3.7 ACCEPTANCE INSPECTION AND TESTS

A. General: Furnish labor, materials, and equipment necessary for tests. Notify Elevator Consultant 5 days in advance when ready for final review of each elevator unit or group. Final acceptance of installation will be made only after all field-quality control reviews have been completed, identified deficiencies have been corrected, all submittals and certificates have been received, and the following items have been completed to satisfaction of Construction Manager and Elevator Consultant's satisfaction.
   1. Workmanship and equipment comply with specification.
   2. Contract speed, capacity and floor-to-floor performance comply with specification.
   3. Performance of following are satisfactory:
      a. Starting, accelerating, and running.
      b. Decelerating and stopping accuracy.
      c. Door operation and closing force.
      d. Equipment noise levels.
      e. All aspects of ride quality.

B. Performance Guarantee: Should tests reveal defects, poor workmanship, variance or noncompliance with the requirements of specifications, complete corrective work to satisfaction of Construction Manager at no cost:
   1. Replace equipment that does not meet specification requirements.
   2. Perform work and furnish labor, materials and equipment necessary to meet specified operation and performance.
   3. Perform and assume cost for re-testing required by Governing Code Authority and Construction Manager to verify specified operation and/or performance

3.8 OWER’S INFORMATION

A. Provide 4 sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 days following turnover for beneficial use. Final retention will be withheld until data are received by Construction Manager and approved by Elevator Consultant. Include the following as minimums, with one set of each on CD-ROM in Adobe

Acrobat format with linked indicies. CD-ROM shall contain a complete index of all pages, and shall allow viewing, copying, and printing of all files.

1. Straight-line wiring diagram of "as-installed" elevator circuits, with index of location and function of components. Mount installation wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Maintain with addition of all subsequent changes. These diagrams are Owner's property. One set to be reproducible master on Mylar, minimum of “C” size sheets.
2. Lubricating instructions, including recommended grade of lubricants.
3. Parts catalogs for all replaceable parts including ordering forms and instructions.
4. All diagnostic and test equipment and complete written instructions unique to troubleshooting and maintenance of equipment installed under this contract. Provide written instructions and a minimum of 4-hours on-site, adjuster-led, training to Construction Manager’s designated personnel regarding use of all equipment for all purposes. Diagnostic and test equipment shall not require any re-setting or re-programming of any type to maintain complete functionality in perpetuity.

B. Acceptance of the installation by General Contractor and/or Construction Manager shall not operate to relieve Elevator Contractor of responsibility to fully comply with requirements of this Article.

END OF SECTION 14210